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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/642,371	08/15/2003	Yong Chen	100110197-1	2549

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HEWLETT PACKARD COMPANY  
P O BOX 272400, 3404 E. HARMONY ROAD  
INTELLECTUAL PROPERTY ADMINISTRATION  
FORT COLLINS, CO 80527-2400

EXAMINER

DANIELS, MATTHEW J

ART UNIT	PAPER NUMBER
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1732

DATE MAILED: 08/15/2006

Please find below and/or attached an Office communication concerning this application or proceeding.

## Office Action Summary

Application No.

10/642,371

Applicant(s)

CHEN ET AL.

Examiner

Matthew J. Daniels

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

### Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

### Status

- 1) ☒ Responsive to communication(s) filed on 09 June 2006.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

### Disposition of Claims

- 4) ☒ Claim(s) 1-33 is/are pending in the application.
- 4a) Of the above claim(s) 19-33 is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 1-18 is/are rejected.
- 7) ☐ Claim(s) \_\_\_\_\_ is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

### Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on \_\_\_\_\_ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

### Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some \* c) ☐ None of:
- ☐ Certified copies of the priority documents have been received.
  - ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
  - ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

\* See the attached detailed Office action for a list of the certified copies not received.

### Attachment(s)

- |  |   |
|--|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892)  | 4) <input type="checkbox"/> Interview Summary (PTO-413)<br>Paper No(s)/Mail Date. _____ |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948)   | 5) <input type="checkbox"/> Notice of Informal Patent Application (PTO-152)             |
| 3) <input checked="" type="checkbox"/> Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)<br>Paper No(s)/Mail Date <u>8/15/03</u> . | 6) <input type="checkbox"/> Other: _____  |

## DETAILED ACTION

### *Election/Restrictions*

1. Applicant's election of Group I, Claims 1-18, in the reply filed on 9 June 2006 is acknowledged. Because applicant did not distinctly and specifically point out the supposed errors in the restriction requirement, the election has been treated as an election without traverse (MPEP § 818.03(a)).

### *Claim Rejections - 35 USC § 112*

The following is a quotation of the second paragraph of 35 U.S.C. 112:

The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

2. **Claims 1-18** are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention. As to Claim 1, the claim limitation "each recess having a bottom and side walls between the top surface of the membrane and the bottom of the recess" is indefinite because "between" is exclusive of endpoints, and the bottom is claimed to be between itself and the top surface of the membrane. Appropriate correction is required.

### *Claim Rejections - 35 USC § 102*

The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

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(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

3. **Claims 1-5, 7-14, and 16-18** are rejected under 35 U.S.C. 102(b) as anticipated by or, in the alternative, under 35 U.S.C. 103(a) as obvious over Sasahara (US 2002/0012825). Applicant defines “nanoscale” on page 1, paragraph [0003] of the specification. **As to Claim 1**, Sasahara teaches a method of making nanoscale catalyst patterns comprising:

- i) providing a malleable membrane having a top surface (Paragraphs [0038], [0039], and [0049]);
- iii) forming one or more nanoscale recesses in the membrane, each recess having a bottom and side walls between the top surface of the membrane and the bottom of the recess (See Figs. 3B and 4B, Par. [0039], and embossing in Par. [0052]); and
- iv) depositing a layer of catalytic material on the top surface of the membrane and the bottom of the recesses (Par. [0057]).

Sasahara does not explicitly teach a mold having nanoscale protrusions and pressing the protrusions into the membrane. However, Sasahara teaches embossing (Par. [0021]) to produce impressed features having nanoscale dimensions (Par. [0019] and Figs. 3B and 4B), and it would have been inherent that a mold having nanoscale protrusions was used because the embossed surface would substantially replicate the size of the embossments used. In the alternative, it would have been obviously desirable to vary the size of the protrusions in view of Sasahara’s teaching to vary the imprint size (Par. [0019]).

**As to Claims 2-5**, Sasahara teaches a membrane that is an ion conductive polymer electrolyte membrane of perfluorosulfonic acid polymer (commercially known as Nafion (DuPont), which is inherently ion conducting and comprised of perfluorosulfonic acid polymer, Par. [0038]). **As to Claims 7 and 8**, Sasahara clearly teaches the claimed height and lateral

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dimensions (Pars. [0019] and [0049]). Use of protrusions having sizes of 5-10 microns would have been inherent or obvious in order to create impressions having that size (Par. [0019]). The Examiner's position is that the teaching of Sasahara contains sufficient specificity to anticipate the claimed size, but in the alternative, the claimed size would have been prima facie obvious as it comprises approximately 20% of the range of Sasahara. **As to Claim 9**, the Examiner interprets the shape of the protrusions of Sasahara to fall within the scope of a "pillar". However, in the alternative, Sasahara clearly suggests that the particular pattern and shape should be varied according to the purpose (Par. [0039] and [0043]). **As to Claims 10 and 11**, Sasahara does not explicitly teach the nanoscale protrusions having a regular pattern or that the resulting pattern has an obverse shape of the protrusions. However, Sasahar clearly teaches that the resulting impressions have a regular pattern, the embossed imprints would inherently replicate the shape of the protrusions used to create them (Pars. [0039]-[0043]). **As to Claims 12 and 13**, the bottom of the recesses are parallel or substantially parallel to the top surface of the membrane, and the side walls are perpendicular to the bottom of the recess and the surface of the membrane (Figs. 2, 3B, 4B). **As to Claim 14**, Sasahara teaches a depth within the claimed range (Pars. [0019], [0039], and [0049]). **As to Claim 16**, the electrode of Sasahara (Item 34 in Fig. 2), placed into contact with the catalyst surface (Item 38 in Fig. 2) would cause the catalytic material to also act as an electrode. **As to Claims 17 and 18**, see platinum (Par. [0030]).

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person

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having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

4. **Claims 6 and 9** are rejected under 35 U.S.C. 103(a) as being unpatentable over Sasahara (US 2002/0012825) in view of Chou (USPN 5772905, of record). Sasahara teaches the subject matter of Claim 1 above under 35 USC 102(b), or in the alternative, under 35 USC 103(a). **As to Claim 6**, Sasahara is silent to the claimed substrate and molding layer. However, Chou teaches a mold comprising a substrate and a molding layer including an array of protruding features having nanoscale dimensions (Fig. 1A, Items 12 and 14). It would have been prima facie obvious to one of ordinary skill in the art at the time of the invention to incorporate the method of Chou into that of Sasahara because Sasahara clearly suggests that the method may use known micromachining techniques which would provide the advantages of fine resolution and high repeatability (Par. 0050)], which Chou's invention, which is a known micromachining technique having fine resolution and high repeatability, would provide. **As to Claim 9**, in the event that Sasahara's features cannot be interpreted to be "pillars", Chou additionally teaches pillars (3:38). It would have been prima facie obvious to one of ordinary skill in the art at the time of the invention to incorporate the method of Chou into that of Sasahara because Sasahara clearly suggests selecting or varying the imprints (Par. [0039]). **As to Claim 15**, Sasahara is silent to the sidewalls remaining free of catalytic material. However, Sasahara clearly suggests depositing catalytic material (Pars. [0006] and [0037]). Chou teaches that in depositing material on an embossed surface, it is conventional for the sidewalls to be substantially free of catalytic material (Fig. 5A). It would have been prima facie obvious to one of ordinary skill in the art at the time of the invention to incorporate the method of Chou into that of Sasahara because Sasahara suggests that

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sufficient void space must be preserved (Pars. [0057] and [0058]), and Chou's method would preserve space at the surface.

### ***Conclusion***

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Matthew J. Daniels whose telephone number is (571) 272-2450. The examiner can normally be reached on Monday - Friday, 8:00 am - 5:30 pm.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Christina Johnson can be reached on (571) 272-1176. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

MJD 8/10/06



  
CHRISTINA JOHNSON  
PRIMARY EXAMINER

8/11/06